Name _____ Period _____ Date _____

Example Problems

1.1 Speed

- Example 1: (How Fast)
  - An elephant running at top speed can travel 26.84 meters in 4 seconds, what is the elephant's average speed in meters per second?

What are the givens and unknowns? *Write the formula and show your work*

$\bar{s}$ =

d =

t =

- Example 2: (How Fast)
  - The fastest of all the dog breeds is a greyhound. A greyhound can run 120.72 meters in 6 seconds, what is the greyhound's average speed in m/s?

What are the givens and unknowns? *Write the formula and show your work*

$\bar{s}$ =

d =

t =

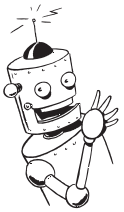
- Example 3: (How Far)
  - A monkey riding a bike travels at a constant speed of 4.3 m/s for 5 s. How far does that monkey travel?

What are the givens and unknowns? *Write the formula and show your work*

$\bar{s}$ =

d =

t =



- Example 4: (How Far)
  - A monkey, in his Porsche is traveling at 20 m/s when he sees a gorilla standing in the middle of the road. It takes the monkey 0.8 s to react before applying the brakes. How far does the monkey travel before the brakes are applied?

What are the givens and unknowns? *Write the formula and show your work*

$\bar{s}$ =

d =

t =

- Example 5: (How Long)
  - You are driving from Austin, TX to St. Paul, MN at an average speed of 35.76 m/s (80 mph). The total travel distance from Austin is 1,905,463 meters (1,184 miles). How long will it take you to reach your destination? Convert your answer to minuets and then hours.

What are the givens and unknowns? *Write the formula and show your work*

$\bar{s}$ =

d =

t =

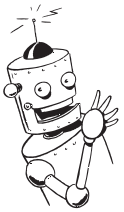
- Example 6: (How Long)
  - The average person walks at a rate of 1.4 m/s (3.1 mph). The circumference of the Earth at the equator is 40,075,884 meters (24,902 miles). How long would it take a person to walk around the Earth? Convert your answer to minuets, then hours, and then days. Note: 1 hour is equal to 3,600 seconds.

What are the givens and unknowns? *Write the formula and show your work*

$\bar{s}$ =

d =

t =



Name _____ Period _____ Date _____

Student Problems

1.1 Speed

YOU MUST SHOW ALL WORK! (Formulas, plug in numbers, answer boxed, units)

1. The fastest man alive can run the 100-meter dash in 9.58 seconds, calculate the average speed in meters per second.

What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

t =

Substitute the known values and solve.

a) _____ _____ ← units

2. The fastest land animal is the cheetah. A cheetah can run the 100-meter dash in 5.95 seconds, calculate the cheetah's average speed in meters per second.

What are the givens and unknowns? *Write the formula you are using*

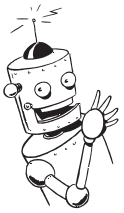
$\bar{s}$ =

d =

t =

Substitute the known values and solve.

a) _____ _____ ← units



3. The record time for the one mile run is 3 min and 43 sec, calculate the average speed in meters per second. (One mile is equal to 1,609.34 meters)

What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

t = *Substitute the known values and solve.*

a) _____ _____ ← units

4. A monkey walks at a pace of 1.5 m/s for 25 seconds, how far does he travel?

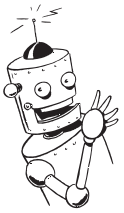
What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

t = *Substitute the known values and solve.*

a) _____ _____ ← units



5. You are speeding down the highway at a rate of 33.53 m/s (75 mph) when you suddenly see a police speed trap so you quickly try to slow down in order to get bellow your current speed. If it takes you 0.89 seconds to react to what you see and apply the brakes, how far do you travel during your reaction time?

What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

t =

Substitute the known values and solve.

a) _____ _____ ← units

6. A monkey watches a thunderstorm from his back porch. He sees a flash of lightning off in the distance and begins counting the seconds until he hears the clap of thunder 5 seconds later. Assume that the speed of sound in air is 340 m/s, how far away was the lightning bolt in meters?

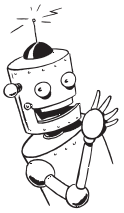
What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

t =

Substitute the known values and solve.



a) _____ _____ ← units

7. An echo is caused when a sound wave travels away from a source, hits a target, and then bouncing back. Sound travels at a speed of 340 m/s in air. If you stand at the rim of the Grand Canyon and yell down towards the bottom, it will take 5.20 seconds for the sound to travel to the canyon floor and then back. What is the total distance the sound wave travels (there and back) and how deep is the Grand Canyon at this location?

What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

Substitute the known values and solve.

t =

a) _____ _____ b) _____ _____

8. A top professional baseball pitcher can throw a baseball at a speed of 44.70 m/s (100 mph). The distance from the pitchers mound to the catcher is 18.39 meters. How much time does the batter have to react to a pitch thrown at 44.70 m/s?

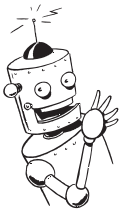
What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

Substitute the known values and solve.

t =



a) _____ _____ ← units

9. Ants can run at an average speed of 0.083 meters per second, how long would it take an ant to run the 100-meter dash in seconds? How many minuets would this take?

What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

d =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

10. The moon is an average distance of 382,500,000 meters (238,855 miles) from the Earth. If you were able to drive a car at an average speed of 44.70 m/s (100 mph) all the way to the moon how long would it take you to reach your destination in seconds? Convert to minuets, hours, and days? Note: 1 hour is equal to 3,600 seconds.

What are the givens and unknowns? *Write the formula you are using*

$\bar{s}$ =

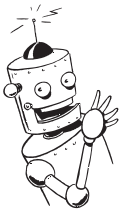
d =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

c) _____ _____ d) _____ _____



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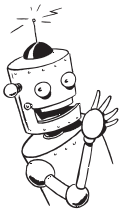


Name _____ Period _____ Date _____

Example Problems

1.2 Distance and Displacement

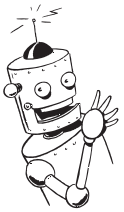
- Example 1:
  - A girl leaves her history classroom and walks 10 meters north to a drinking fountain. Then she turns and walks 30 meters south to her art classroom. What is the girl's total displacement from her history classroom and what is the total distance she traveled?

- Example 2:
  - A bird flies west for 8.5 kilometers and east for 3 kilometers, and then turns around and heads back west for 2 kilometers. What is the total distance the bird travels and what is the birds displacement ?

- Example 3:
  - In a drill during basketball practice, a player runs the length of the 30 meter court and back. The player does this three times in 60 seconds. What is the magnitude of the player's total displacement and what is the total distance traveled?

- Example 4:
  - A person travels 23 meters north in 16 sec, 5 meters south in 4 sec, and 16 meters north in 18 sec. What was the total distance traveled and what is the total displacement?

- Example 5:
  - From the problem above what is the person's average speed and average velocity?

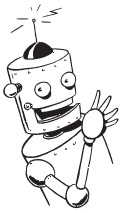


- Example 6:
  - A monkey travels 48.28 m north in 12 sec, then 40 m south in 27 sec. What is the monkey's average speed and the average velocity in m/s?

- Example 7:
  - On a highway, a car is driven 80 kilometers during the first 1.00 hour of travel, 50 kilometers during the next 0.50 hours, and 40 kilometers in the final 0.50 hours. What is the car's average speed for the entire trip in km/hr?

- Example 8:
  - A car travels 90 meters due north in 15 seconds. Then the car turns around and travels 40 meters due south in 5.0 seconds. What is the magnitude of the car's average velocity for the entire trip?

- Example 9:
  - A ball shot into the air travels to a maximum height of 20 meters and then falls back to the release point in 4 seconds. What was the average speed of the ball and what is the average velocity of the ball in meters per second?



Name _____ Period _____ Date _____

Example Problems

1.3 Acceleration

- Example 1:
  - The Lamborghini Murcielago can accelerate from 0 to 27.8 m/s (62.2 mph) in a time of 3.40 seconds. Determine the magnitude of the acceleration.

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

- Example 2:
  - An Indy 500 race car's velocity increases from 4.0 m/s to 36 m/s in a 4.0-s time interval. What is the racer car's average acceleration?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

- Example 3:
  - The driver of a Ferrari Formula One car applies full brakes slowing the vehicle from 27.8 m/s to 0 in 1.22 seconds. Determine the magnitude and direction of the acceleration under full braking.

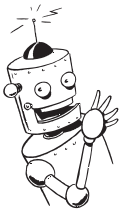
What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$



- Example 4:
  - A monkey is traveling at 8.33 m/s when he accelerates at a constant rate of 3.5 m/s². What is the velocity of the monkey after velocity 7.3 seconds?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

- Example 5:
  - A monkey is playing miniature golf. The monkey hits the golf ball and the ball rolls up a hill toward the hole. If the ball starts with a speed of 2.0 m/s and slows at a constant rate of -0.32 m/s², what is the balls final velocity after 2.0 s?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

- Example 6:
  - If a car accelerates from rest at a constant 5.5 m/s², how long will it take to reach a velocity of 28 m/s?

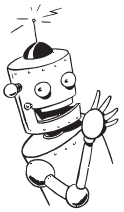
What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$



- Example 7:
  - A car it slowed from 22 m/s to 3.0 m/s at a constant rate of 2.1 m/s². How long will it take before the car is traveling at a final velocity of 3.0 m/s?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

- Example 8:
  - A car driven by a monkey has stalled and is rolling backwards downhill with a speed of 3.0 m/s. The monkey suddenly get the car started again and begins accelerating up the hill. After 2.5 s, the car is moving uphill at a speed of 4.5 m/s. Assuming that the uphill direction is the positive, what is the car's average acceleration during this entire event?

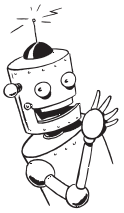
What are the givens and unknowns? *Write the formula and show your work*

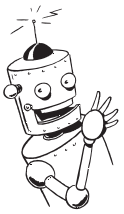
$a =$

$v_o =$

$v_f =$

$t =$





Name _____ Period _____ Date _____

Student Problems

1.3 Acceleration

YOU MUST SHOW ALL WORK! (Formulas, plug in numbers, answer boxed, units)

11. The "average" car on the road will go from 0 to 27 m/s (0-60 mph) in 7.71 seconds. Calculate the magnitude of the acceleration for the "average" car in m/s²?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

a) _____ _____ ← units

12. The highest launch acceleration of a roller coaster is in Japan. The Dodonpa can change velocity from 0-47.83 m/s (0-107 mph) in 1.8 seconds pulling 2.7 g's, what is the magnitude of the Dodonpa roller coaster's acceleration of the in m/s²?

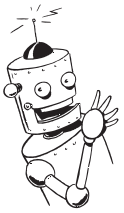
What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$



a) _____ _____ ← units

Name _____ Period _____ Date _____

Chapter 1 Linear Motion

13. The Batmobile is initially traveling at 8.3 m/s when it speeds up to a final velocity of 32.1 m/s in 6.8 s, what is the magnitude of the Batmobile's acceleration?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

a) _____ _____ ← units

14. A monkey is riding his bike traveling with an initial velocity of 9.6m/s when he starts peddling faster and faster accelerating to a final velocity of 19.5 m/s in 4.5 seconds. What is the magnitude of the monkey's acceleration?

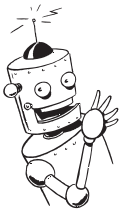
What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$



a) _____ _____ ← units

15. A car, driven by a monkey, is traveling at a velocity of 24.59 m/s when the monkey sees a gorilla crossing the road up ahead and has to slams on the brakes. If it takes the car 4.2 seconds to come to rest what is the magnitude of the car's acceleration?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

a) _____ _____ ← units

16. A monkey is driving a car at 26.82 m/s when he takes his foot off the gas and coast for 4.5 seconds; this causes the vehicle to slow down to a final velocity of 18.7 m/s. What is the magnitude of the vehicle's acceleration?

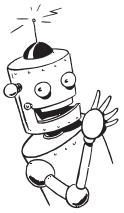
What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$



a) _____ _____ ← units

17. On a dry road a car with good tires can decelerate at 4.92 m/s². How long would it take a car initially traveling at 24.6 m/s to come to rest?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$

a) _____ _____ ← units

18. The head of a rattlesnake can accelerate at a magnitude of 50 m/s² as it strikes it's victim. If a car could have the same acceleration as a rattlesnake, how much time would it take for the car to go from 0 m/s to 26.82 m/s (0-60 mph)?

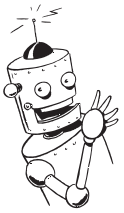
What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$t =$



a) _____ _____ ← units

Name _____ Period _____ Date _____

Chapter 1 Linear Motion

19. The brakes on the "average" automobile are capable of slowing a car at a rate of 5.18 m/s². If you are traveling at 80 mph (35.76 m/s) when you suddenly see a state trooper on the highway, how much time will it take you to slow your car down to the speed limit if the posted speed is 65 mph (29.06 m/s)?

What are the givens and unknowns? *Write the formula and show your work*

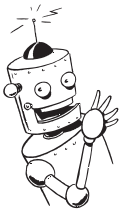
$a =$

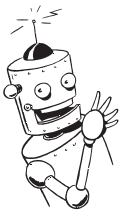
$v_o =$

$v_f =$

$t =$

a) _____ _____ ← units





Name _____ Period _____ Date _____

Example Problems

1.4 Kinematics

- Example 1:
  - Superman is flying at 145 m/s when he suddenly increases his speed uniformly at a rate of 23.1 m/s² for 20.0 s. What is Superman's final velocity?

$a =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta d =$

$t =$

- Example 2:
  - The Flash has an initial velocity of 22 m/s when he increases his speed uniformly at the rate of 1.6 m/s² for 6.8 s. What is The Flash's final velocity?

$a =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta d =$

$t =$

- Example 3:
  - How far does Superman fly in 15 s while he changes his velocity from 145 m/s to 75 m/s at a uniform rate of acceleration?

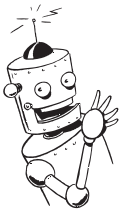
$a =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta d =$

$t =$



- Example 4:
  - A car traveling on a straight road at 15.0 m/s then accelerates uniformly to a speed of 21.0 m/s for 12.0 seconds. What is the total distance the car travels in 12.0 seconds?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

- Example 5:
  - An airplane starts from rest and accelerates at a constant 3.00 m/s² for 30.0 s before leaving the ground. What is the plane's displacement before it leave the ground?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

- Example 6:
  - A monkey is jogging with an initial velocity of 4.2 m/s when he accelerates uniformly at a rate of 4.1 m/s² for 7 seconds along a straight line path. What is the magnitude of the monkey's displacement?

What are the givens and unknowns? *Write the formula and show your work*

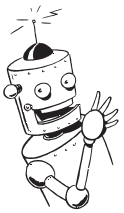
$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$



Name _____ Period _____ Date _____

Chapter 1 Linear Motion

- Example 7:
  - Superman starts from rest and accelerates uniformly at a rate of 5.0 m/s². What is Superman's final velocity after he has traveled 500 meters?

What are the givens and unknowns? *Write the formula and show your work*

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

- Example 8:
  - A race car can be slowed with a constant acceleration of –11 m/s². If the car is going 55 m/s, how many meters will it take the car to come to a to stop?

What are the givens and unknowns? *Write the formula and show your work*

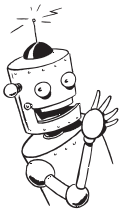
$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$



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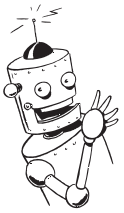
Chapter 1 Linear Motion



Name _____ Period _____ Date _____

Student Problems

1.4 Kinematics

YOU MUST SHOW ALL WORK! (Formulas, plug in numbers, answer boxed, units)

20. A monkey on a skateboard starts from rest at the top of a big hill. The monkey pushes off and heads down the hill accelerating at a rate of 2.3 m/s² for 15 s. What is the monkey's final velocity after 15 seconds?

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ← units

21. Squidward Tentacles is traveling through a school zone with a velocity of 13.41 m/s (30 mph). At the end of the school zone Squidward accelerates at a rate of 5 m/s² in order to get back up to speed, what is Squidward's velocity after 2.5 seconds.

What are the givens and unknowns? *Write the formula you are using*

a =

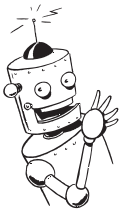
v_o =

v_f =

Δd =

t =

Substitute the known values and solve.



a) _____ _____ ← units

22. A Sandy Cheeks is coasting on her skateboard with an initial velocity of 4 m/s when she comes to the bottom of a hill and begins to slow decelerating uniformly at the rate of 1.6 m/s² for 2.7 s. What is the Sandy's final velocity at the end of the 2.7 s?

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ⟵ units

23. A Spong-Bob is starting from rest on his scooter and accelerates uniformly at a rate of 4.90 m/s². What is Spong-Bob's velocity after he has traveled 200-meters?

What are the givens and unknowns? *Write the formula you are using*

a =

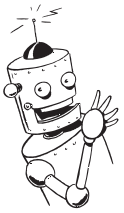
v_o =

v_f =

Δd =

t =

Substitute the known values and solve.



a) _____ _____ ⟵ units

24. Patrick Star is initially jogging with an initial velocity of 5.0 m/s when he accelerates uniformly at 2.3 m/s^2 for 12 seconds along a straight line path. What is the magnitude of the Patrick's displacement during this 12-second interval?

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ◄—— units

25. How far does Mr. Crab travel in 15 s as he changes his velocity from 24.58 m/s (55 mph) to 31.29 m/s (70 mph) at a uniform rate of acceleration?

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

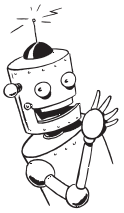
v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ◄—— units



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26. What is the distance covered by a formula 1 race car that starts from rest accelerating at 11.18 m/s² to a final velocity of 44.70 m/s (0-100 mph)?

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ◄—— units

27. A top fuel dragster can accelerate at a rate of 44 m/s². How fast will the dragster be moving if it starts from rest and accelerates uniformly all the way to the finish 402 meters away (quarter-mile)?

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

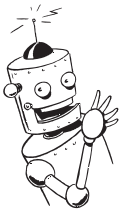
v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ◄—— units



28. Rickey Henderson, baseball's record holder for stolen bases, approaches third base. He dives head first, hitting the ground at 6.75 m/s and reaching the base at 5.91 m/s, accelerating at -5.11 m/s/s. Determine the distance Rickey slides across the ground before touching the base.

What are the givens and unknowns? *Write the formula you are using*

a =

v_o =

v_f =

Δd =

t =

Substitute the known values and solve.

a) _____ _____ ← units

29. A 2015 Porsche Boxster GTS can go from 0 m/s to 26.82 m/s (0-60 mph) in 4.2 seconds. Assuming the acceleration remains constant (in the real world it does not), what is the acceleration of the Boxster and how far does it travel?

What are the givens and unknowns? *Write the formula you are using*

a =

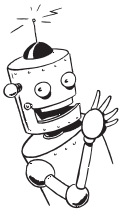
v_o =

v_f =

Δd =

t =

Substitute the known values and solve.



a) _____ _____ b) _____ _____

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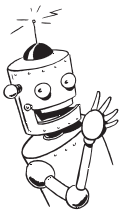
Chapter 1 Linear Motion



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Example Problems

1.5 Free Fall

- Example 1:
  - A monkey drops a brick from a scaffold while doing some stone work on a very tall building. What is the velocity of the brick after 4.0 s and how far does it fall?

$g =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 2:
  - A coconut is dropped from a hovering helicopter by a monkey trying to hit a gorilla on the head bellow. After it's release, what is the velocity of the coconut and how far does has it fallen after 6 seconds?

$g =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 3:
  - In order to open a clam a seagull has learned to drop the clam onto a hard surface from high point. If a seagull flies to a height of 25 m and drops the clam, how long will the clam be in the air and how fast will it be moving when it hits the ground?

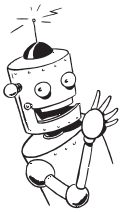
$g =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta h =$

$t =$



- Example 4:
  - According to Guinness, the tallest man to have ever lived was Robert Pershing Wadlow of Alton, Illinois. He was last measured in 1940 to be 2.72 meters tall (8 feet, 11 inches). Determine how long it would take a quarter to hit the ground and how fast it will be moving if dropped from the top of his head.

Write the formula and show your work

$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 5:
  - At Six Flags over Texas, a popular ride known as "The Scream" carries passengers up to a height of 62.5 m and then drops them to the ground. How fast are the passengers going at the bottom of the ride and how long does the fall take?

Write the formula and show your work

$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 6:
  - A stone is thrown vertically down from the roof of a building by a monkey. The stone passes a window 14.0 m bellow the roof with a speed of 22.0 m/s and hits the ground 2.80 s after it was initial thrown. Determine the initial velocity of the stone and the height of the building.

Write the formula and show your work

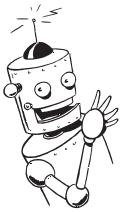
$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$



- Example 7:
  - A monkey is sitting up in a tree when he looks down and sees a gorilla standing beneath him on the ground. The monkey takes aim and then throws the coconut at the gorilla. If the coconut leave the monkey's hand traveling at 5 m/s and the gorilla is located 10 meters below the monkey, how long does it take the coconut to hit the gorilla and how fast is it traveling when it lands on the gorillas head?

$g =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 8:
  - An astronaut standing on a platform on Mars drops a hammer. If the hammer falls a distance of 6.0 meters in 1.78 seconds, what is its acceleration of gravity on the Mars?

$g =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 9:
  - An astronaut standing on a platform on Jupiter drops a hammer. If the hammer falls a distance of 6.0 meters in 0.68 seconds, what is its acceleration of gravity on the Jupiter?

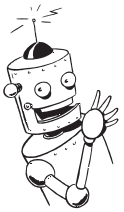
$g =$ *Write the formula and show your work*

$v_o =$

$v_f =$

$\Delta h =$

$t =$



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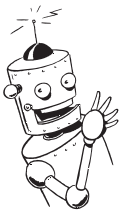

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Student Problems

1.5 Free Fall

YOU MUST SHOW ALL WORK! (Formulas, plug in numbers, answer boxed, units)

30. A monkey is standing under a coconut tree when a coconut falls from the tree and hits the monkey on his head. If the time of fall was 1.8 s, how fast was the nut falling when it hit the monkey on the head and how far did the coconut fall?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

31. A baseball dropped from the top of a building takes 3.1 seconds to hit the ground. How fast is the ball traveling when it hits the ground and how tall is the building?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

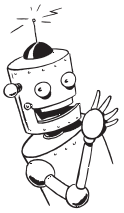
v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____



32. The acceleration of gravity on Mars is 3.72 m/s². If a ball is dropped from rest how and hits the ground in 4 seconds how far did the ball fall and how fast is it moving when it hits the ground?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

33. The acceleration of gravity on Jupiter is 24.5 m/s². If a ball is dropped from rest how and hits the ground in 4 seconds how far did the ball fall and how fast is it moving when it hits the ground?

What are the givens and unknowns? *Write the formula you are using*

g =

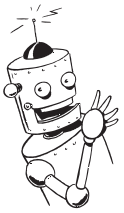
v_o =

v_f =

Δh =

t =

Substitute the known values and solve.



a) _____ _____ b) _____ _____

34. You are on the observation deck of the UT Tower at the University of Texas campus. You want to get a rough estimate of how high up you are so you drop a quarter from the observation deck and count how many seconds it takes before for the quarter to hit the ground. Your rough count gives you a time of 4 seconds. How high up are you and what is the velocity of the coin as it hits the ground?

What are the givens and unknowns? *Write the formula you are using*

$g =$

$v_o =$

$v_f =$ *Substitute the known values and solve.*

$\Delta h =$

$t =$

a) _____ _____ b) _____ _____

35. A monkey waves to the crowd bellow and then jumps from a 120-m high bridge without first attaching the bungee cord. How long does the monkey have to think about his error and how fast will the monkey be traveling when he hits the ground?

What are the givens and unknowns? *Write the formula you are using*

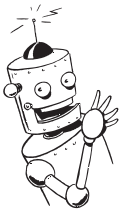
$g =$

$v_o =$

$v_f =$ *Substitute the known values and solve.*

$\Delta h =$

$t =$



a) _____ _____ b) _____ _____

Chapter 1 Linear Motion

36. You drop a penny from the observation deck located on the 102 nd floor of the Empire State building in New York City 381 m (1,250 ft) above the ground. How long does it take the penny to hit the ground and how fast is the penny falling when it does hit the ground?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

37. A raindrop falls to the Earth from a cloud 1,700 m above the Earth's surface. If the raindrop was not slowed by air resistance how long will it take the raindrop to hit the ground and how fast will the raindrop be falling by the time it hit the ground?

What are the givens and unknowns? *Write the formula you are using*

g =

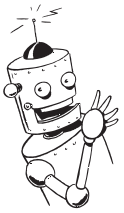
v_o =

v_f =

Δh =

t =

Substitute the known values and solve.



a) _____ _____ b) _____ _____

38. A ball is thrown towards the ground from a window 50 m above the ground with an initial speed of 12.0 m/s. How long and how fast will the ball be traveling when it hits the ground?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

39. A monkey is standing on the porch of his tree house and throws a banana with a velocity of 20 m/s towards a gorilla standing on the ground. The banana hits the gorilla on the head traveling 39.70 m/s. How high up is the monkey's tree house?

What are the givens and unknowns? *Write the formula you are using*

g =

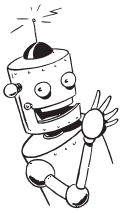
v_o =

v_f =

Δh =

t =

Substitute the known values and solve.



a) _____ _____ ← units

40. An astronaut is standing on a platform on the Moon when he drops a hammer. If the hammer falls a distance of 6.0 meters in 2.7 seconds, what is its acceleration of gravity on the moon?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ ⟵ units

41. On a planet ruled by apes, a rock is dropped from rest and takes 0.63 seconds to falls a vertical distance of 0.72 meter. What is the magnitude of the acceleration due to gravity on this so called "Planet of the Apes"?

What are the givens and unknowns? *Write the formula you are using*

g =

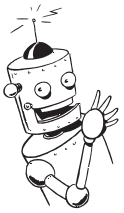
v_o =

v_f =

Δh =

t =

Substitute the known values and solve.



a) _____ _____ ⟵ units

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Example Problems

1.6 Going Up

- Example 1:
  - A monkey is trying out to be a ballerina. The monkey performs a pirouette jump by jumping straight up in the air with an initial speed of 1.8 m/s. How long is the monkey in the air and how high does she go?

What are the givens and unknowns? *Write the formula and show your work*

$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 2:
  - A tennis ball is thrown straight up with an initial speed of 22.5 m/s. How long is the ball in the air and how high does it go?

What are the givens and unknowns? *Write the formula and show your work*

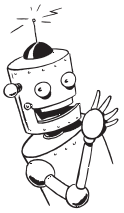
$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$



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- Example 3:
  - The Steamboat Geyser in Yellowstone National Park, Wyoming, is capable of shooting its hot water up from the ground with a speed of 48.0 m/s. How high can this geyser shoot?

What are the givens and unknowns? *Write the formula and show your work*

$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 4:
  - During a baseball game, a batter hits a high pop-up. If the ball remains in the air for 6.0 s, how high does it rise and what was the original velocity of the ball as it left the bat?

What are the givens and unknowns? *Write the formula and show your work*

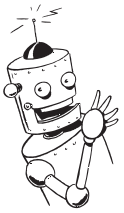
$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$



- Example 5:
  - A startled armadillo jumps straight up into the air. If the total time the armadillo is in the air is 0.87 second how high did it rise and what was the original velocity of the jump?

What are the givens and unknowns? *Write the formula and show your work*

$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$

- Example 6:
  - With what initial speed must a ball be thrown upward to reach a height of 24.0 m and how long will the ball stay in the air?

What are the givens and unknowns? *Write the formula and show your work*

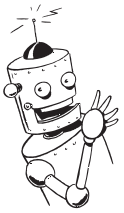
$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$



- Example 7:
  - Former NBA player, Michael Jordan, has an impressive vertical jump of 1.22 meters. What was the original velocity as Michael Jordan left the floor and what is the total hang time?

What are the givens and unknowns? *Write the formula and show your work*

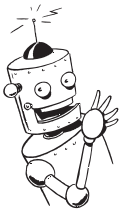
$g =$

$v_o =$

$v_f =$

$\Delta h =$

$t =$



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Student Problems

1.6 Going Up

YOU MUST SHOW ALL WORK! (Formulas, plug in numbers, answer boxed, units)

42. A bullet is fired from a gun pointed straight up into the air with a muzzle velocity of 460 m/s. How long does it take bullet to reach its maximum height and what is the maximum height attained by the bullet?

What are the givens and unknowns? *Write the formula you are using*

$g =$

$v_o =$

$v_f =$ *Substitute the known values and solve.*

$\Delta h =$

$t =$

a) _____ _____ b) _____ _____

43. A monkey is trying out to be a baseball player. The monkey try to perform a dunk and jumps straight up into the air with an initial speed of 2.8 m/s. If the hoop is 3.05 m from the ground, does the monkey make the dunk and how long is he in the air?

What are the givens and unknowns? *Write the formula you are using*

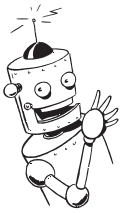
$g =$

$v_o =$

$v_f =$ *Substitute the known values and solve.*

$\Delta h =$

$t =$



a) _____ _____ b) _____ _____

44. At the beginning of a basketball game, a referee tosses the ball straight up into the air with a speed of 4.6 m/s. A player cannot touch the ball until the ball reaches it's maximum height. What is the minimum time that a player must wait before touching the ball and how high does the ball go from it point of released?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

45. A basketball player jumped straight up to grab a rebound. If she was in the air for a total of 0.80 second (up and down), how high did she jump?

What are the givens and unknowns? *Write the formula you are using*

g =

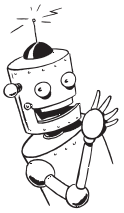
v_o =

v_f =

Δh =

t =

Substitute the known values and solve.



a) _____ _____ ← units

46. A banana is thrown vertically upward by a monkey and takes 3.5-seconds to reach it's highest point. What is the total time the banana is in the air, what was the original velocity of the banana, and what was the maximum height attained by the banana?

What are the givens and unknowns? *Write the formula you are using*

$g =$

$v_o =$

$v_f =$ *Substitute the known values and solve.*

$\Delta h =$

$t =$

a) _____ _____ b) _____ _____

47. A ball is thrown vertically upward and is in the air for a total of 4.6 seconds (up and down), how long did it take the ball to reach it's maximum height, what was the original velocity of the ball, and what was the maximum height attained by the ball?

What are the givens and unknowns? *Write the formula you are using*

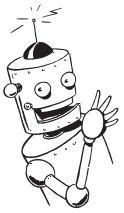
$g =$

$v_o =$

$v_f =$ *Substitute the known values and solve.*

$\Delta h =$

$t =$



a) _____ _____ b) _____ _____

48. At what speed do you have to throw a ball into the air in order to reach a maximum height of 15 meters from the ground and how long will it be in the air?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ b) _____ _____

49. The world record for a vertical jump was achieved by Kevin Bania. Keven jumped an incredible 1.626 meters (64 inches) from a standing start in 2013, calculate how long keven was in the air and how fast Keven left the ground.

What are the givens and unknowns? *Write the formula you are using*

g =

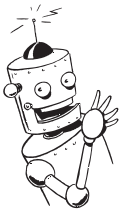
v_o =

v_f =

Δh =

t =

Substitute the known values and solve.



a) _____ _____ b) _____ _____

Name _____ Period _____ Date _____

Chapter 1 Linear Motion

50. The ceiling in a physics classroom is 2.6 meters from the ceiling to the floor. A student is trying to bounce a rubber supper ball off the floor so that the subber ball bounces towards the ceiling and then "just" touches the ceiling above. At what speed must the supper ball bounce off the floor in order to "just" touch the ceiling?

What are the givens and unknowns? *Write the formula you are using*

g =

v_o =

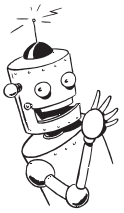
v_f =

Δh =

t =

Substitute the known values and solve.

a) _____ _____ ← units



Name _____ Period _____ Date _____